

DBD PLASMA CATALYSIS PROCESS FOR CARBON RECOVERY

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Since many years carbon dioxide reduction by hydrogen through catalyst processes is a usual way from the Paul Sabatier reaction to produce CH₄. this process is able to be done from thermal process by using an heterogeneous catalyst such as zirconia cerium support with nickel sites for the hydrogen reduction of CO₂. However this reaction is well working (85%-90%) at 350°C and its selectivity depends of the secondary reactions such us carbon monoxide or carbon deposit which appears above 350°C.

Our goal is to point out that the cerium oxide is a N semiconductor while Nickel sites are a P semiconductor and by that way we have a N-P semiconductor so the bimetallic catalyst is able to produce electrons for the CO₂ reduction when the DBD plasma polarize the ceramic in the small pores of the bulk of the pellet (plasma appears inside the pore) We have *demonstrated an electro catalyst process working at room* temperature with a high efficiency close to 85% -90% and a selectivity of 100% . The exothermal reaction of the reduction increases the temperature of the reactor until 120°C without any secondary reactions (CO,Carbon deposit)and points out the role of the N-P semiconductor as the key step for the electron flow to reduce the CO₂ into CH₄ .